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half a dozen sciences. In short, if one loses sight of the essential facts in the historical development of science one is always in danger of demanding that the scientist attempt final explanations of phenomena which available knowledge is not competent to explain.

As Dr. Ruml does not define what he means by "theoretical psychology," "problems of fundamental significance," etc., it is impossible to say in how far he has neglected this aspect of the problem. If by theoretical psychology he refers to problems of fundamental importance to the science of psychology, then the charge that mental testing has been futile may be emphatically denied. A science of human mind can not regard as trivial such problems as individual and racial differences in mental ability, the relationships of mental traits, the phenomena of mental growth, the limitations of educability, or the psychology of genius, mental deficiency and insanity. On all these problems mental tests have thrown light, in some cases more than the entire previous history of psychology. Indeed the mental test method, using the word "test" in the broad sense, has become the most important method of experimental psychology. It is proving itself applicable not only to the problems of intelligence, but also to those of emotion, volition, character, and temperament. It is indispensable in the study of habit formation, mental fatigue, mental inheritance, and animal behavior, while in psychopathology it promises soon to overshadow all other methods. Yet the movement is still in its early infancy.

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REVIEWS AND ABSTRACTS OF LITERATURE

Instinct and the Unconscious: A Contribution to a Biological Theory of the Psycho-neuroses: W. H. R. RIVERS. Cambridge University Press. 1920. Pp. vi+252.

Here is another effect in the field of psychology that is the result of the stimulus of the revolutionary theories of Freud. Rivers's book is an attempt to give to the Freudian theories a biological interpretation; namely, that every animal function is (or *was* in the animal's evolution) of some use. The theory of natural selection says that all parts of the animal developed through their utility. The effort called a "biological interpretation" on the part of some biologists to give an explanation of the use, past or present, of every function is opposed by others (chiefly Loeb and his followers) who maintain that many functions are and have been of no use to the animal. If we agree with the former, then Rivers

has given us a biological formulation of the mechanisms of the Freudian theory that should make them acceptable to scientists.

Rivers begins with a short mention of the immense number of psycho-neuroses the war produced. Freud is credited as the originator of a complete scheme as to their causations and mechanisms. While agreeing in the main with the mechanisms, he says that "in the vast majority of the cases that occurred in war times there is no reason to suppose that factors derived from the sexual life played any essential part in causation but that these disorders became explicable as the result of disturbance of . . . the instinct of self preservation."

However, in speaking of hysteria in civil practise, Rivers says (page 135) that "according to my view hysteria as we know it through the effects of warfare is primarily due to the activity of the danger instinct. . . . My own experience of hysteria in civil practice is too small to enable me to deal adequately with this problem." And "There can be little doubt that factors connected with sex take a most important part in the ætiology of this state." Further, on page 120 Rivers says: "The differences between the neuroses of war and those of civil life are due in large measure to differences in the nature of the instinctive tendencies which have escaped from control. The relative simplicity of the war neuroses is due to their origin in disturbance of the relatively simple instinct of self-preservation, while the great majority of the neuroses of civil practice depend on failure of balance between the less simple sexual instinct and the very complex social forces by which this instinct is normally controlled."

It is interesting to see that Rivers, who has had almost as much experience with men who have developed neuroses from exposure to danger as Freud has with those who developed them in civil life, applies the Freudian mechanism to the danger instinct as readily as Freud does to the sex instinct. The view so hotly held that Freud lays too much stress on sex as a causative factor is but partially supported. Sex is shown not to be the only or sole causative factor of the neuroses. On the other hand, and this is supremely important, it is shown that the Freudian mechanisms operate in the psycho-neuroses of war as well as peace.

Much as Freud's views on all matters are still bitterly attacked, so calm and candid an expert as Rivers does well to point out that the world owes Freud a huge debt, in that without his clues to the psycho-neurotic mechanisms the highly successful psycho-therapeutic results in the war might not have been obtained. Freud and those who agree wholly or in part with him have always felt that

there was and is much about the neuroses that still needs understanding.

The main purpose of the book is to "consider these mechanisms in their relation to the more normal processes of the animal organism and especially to the mechanism by which certain parts of experience become so separated that they are no longer capable of recall to consciousness," . . . "to consider the biological function of this process by which experience passes into the region of the unconscious," and "to show that the psycho-neurosis is the solution of a conflict between opposed and incompatible principles of mental activity." This calm assumption of "the unconscious," this recognition of a process whereby functions which were conscious become unconscious, upon whose importance Freud so strongly insisted, must be rather unpleasant to the school of Wundt and Dunlap.

Rivers next says "the term unconscious applies to experience . . . as is not capable of being brought into the field of consciousness by any of the ordinary processes of memory or association." This is Freud's conception of the term.

Repression is reserved for "the process by which we wittingly endeavor to banish experience from consciousness" while suppression which Rivers uses as the psycho-analysts use repression "occurs wholly without the intervention of volition." Repression in the Rivers sense is but one of the many ways in which suppression may and often does take place. There is good reason to believe that it takes place without conscious effort. "Suppression is a reaction to pleasures and pains which are immediately present and takes no account of the more extended experience with which it is the function of intelligence to deal." The physiological research work of Head, Rivers and Sherren that resulted in the formulation of the afferent mechanisms of protopathic and epicritic sensibility is the source from which an understanding of suppression is derived.

Protopathic sensations only tell us that something is there and that it is pleasant or unpleasant, hot or cold, and that it is mere contact or pressure. Epicritic sensibility, probably a later phylogenetic development, is characterized by exact discrimination and localization. Protopathic sensibility is crude and the reactions it produces are sudden and of a mass type. Epicritic sensibility is complex and delicate and may result in many forms of reaction depending upon the nature of the stimulating object. When they coexist they fuse and "certain aspects of the earlier forms of sensibility are modified to a greater or less extent and in some cases this modification involves disappearance of certain characters" and the result is normal cutaneous sensibility. The characters of

radiation and distant reference in protopathic sensibility become latent and can reappear only under appropriate conditions. This has been experimentally determined and it was possible for Rivers to actually produce suppression by the application of cold. "The experiment revealed a feature of primitive sensibility which had been so successfully suppressed that its existence had not been suspected until the beginning of the twentieth century." This is not quite fair to Freud since in his *Zur Geschichte der psychoanalytischen Bewegung* he says "The Theory of repression is one of the foundations upon which psychoanalysis rests" and he formulated 'repression' first in 1896 in his *Weitere Bemerkungen über die Abwehr-Neuropsychosen* which appeared in the *Neurologisches Zentralblatt*, 1896, No. 10.

Head, working in conjunction with Holmes, showed that there is a relation between the cortex and the optic thalamus that is analogous to that existing between protopathic and epicritic sensibility. The experimental proof for Freud's clinically derived conception of "repression" may eventually be derived from experiments in this field. Simply stated it is the mechanism of inhibition that in its evolution is called upon for an understanding of all these phenomena. It is the chief constituent of suppression. "Control or inhibition belongs to the essence of nervous activity" and it is suggested that "suppression by which experience becomes unconscious is only a special variety of the process of inhibition common to every phase of animal activity." He shows how at first it works on the "all-or-none" principle, how it then becomes graded and throughout shows its results in function and structure. He makes inhibition of early tendencies a *corollary* of evolution. Primitive patterns of activity must be kept from going into action in favor of more discriminating ones. In pathological states the earlier forms are again used.

The content of the unconscious is made up of experiences, both emotional and intellectual, but the latter always connected with a strong affective tone in which emotions that interfere with comfort and happiness have been strongly roused. In addition there are large elements of more or less neutral experiences, such as the setting in which the pain was experienced, that are carried into the unconscious in the act of suppressing the painful experience. The unconscious is therefore the storehouse of experience associated with instinctive reactions.

In the chapter on the nature of instincts he contends that the behavior of animals is not as fixed and mechanical (reflex) as we had supposed, while man's is much more so. The difference between man and animals is one of degree and not of kind. The theoretical

differences between instinct and intelligence are easily made but the practical differences are more difficult to describe accurately.

It is possible to observe the most complicated behavior in insects and other animals that is wholly independent of individual experience. But in the case of the higher animals, including man, this is not so easily observed. In man it is very difficult to separate innate from acquired experience.

He then analyzes the nature of instincts. He leaves out of consideration the instincts of insects and invertebrates as being too different from those of man and the vertebrates. The behavior of adult man as compared to that of infants and animals is examined for criteria for his classification. One of the characteristics of the response of an infant or animal to danger is that it tends to be made with all its vigor and without discrimination. In certain cases this is also true of adult man. When man does this he may be said to act instinctively and acting thus, he shows an absence of gradation. To characterize these responses Rivers borrows a term from psychology "the all-or-none reaction" originally used by Keith Lucas and A. D. Adrian. Responses which are of the "all-or-none" type show: first, absence of exactness of discrimination, of appreciation and of gradation of response; second, they react to the stimulus with all their possible energy; third, the response is immediate and uncontrolled.

Head and Gordon Holmes have shown that all these characteristics are true in a large measure of optic thalamus activities. Rivers brilliantly suggests that these be viewed as the protopathic aspects analogous to peripheral protopathic sensibility and that they form the central basis of emotional reaction. This type of activity, although instinctive, is quite different from the highly patterned activity of insects which we also call instinctive although these may also be subject to the "all-or-none" principle. Rivers therefore proposes that instincts be classified as protopathic and epicritic. Protopathic instincts act on the "all-or-none" principle and are not capable of gradation. Epicritic instincts are discriminative and graded in their activity. The latter characterize the elaborate instincts of insects and certain forms of innate behavior in man. The former are especially obvious in some of the innate behavior of man and animals. To us it seems that when the response of an organism to a stimulus is so graded that it can be called epicritic it is highly integrated and when observed we call such behavior intelligent. If this be true we have just as much an instinct to be intelligent as we have an instinct to fight, fear, *etc.*

For the purpose of discussing the danger instincts Rivers now divides instincts in general into self-preservative, race-preservative

and social or herd instincts. The first is subdivided into "attractive" forms such as hunger and thirst and "repulsive" forms such as disgust.

From this point on there is the same attempt at division without any well marked lines of demarkation that marks the usual psychology of old whenever it leaves the biological method of approach. After the classification is set up the reactions to danger are connected with specific forms of emotion.

Rivers connects flight with fear, aggression with anger, manipulative activity with absence of affect. The absence of fear and pain in manipulative activity when the latter is a response to a danger stimulus is explained by their being suppressed. The complete suppression of fear and pain in the act of immobility is also suggested and the possibility that suppression was in its earliest forms brought about by the response of immobility to danger in the effort to suppress fear and pain (page 59).

Of course, Rivers's chief endeavor has been to show the suppression of affect in the organism's response to danger in such states as immobility in animals and manipulative activity in man. The latter is distinguished from the former in that there need be no loss of memory of the events that produced the reaction. That there may be complete loss of memory is well known and may be accounted for by the completeness of the suppression.

This completeness of suppression which he calls "all-or-none" is the form it takes in infants, children and animals. In adults it occurs in pathological states due to the process of regression which "steps down" activity to a pattern it acted upon in an earlier state. Suppression on the "all-or-none" principle must have come into existence very early in the evolution of animal life. The need for this complete kind of suppression of earlier or alternate modes of behavior Rivers illustrates by the life of the caterpillar that becomes a butterfly and the tadpole that becomes a frog. In both cases the persistence of the earlier form of activity would terminate the life of the fully developed animal.

In man there is not only suppression of tendencies and experiences but there is evidence that these lead a kind of independent existence which motivates and modifies behavior and is incapable of recall by ordinary processes of memory.

This independent existence of a suppressed experience is usually known as dissociation. When it returns to consciousness as multiple personality, Rivers, adopting Morton Prince's terminology, calls it "co-conscious," but in the case of a fugue he purposes to speak of "alternate consciousness." He also limits the term

“dissociation” to those activities that are accompanied by independent consciousness.

Rivers here makes a bold attempt to carry Elliot Smith’s suggestion, *viz.* cerebral development was in part due to the stimulus of arboreal life on early man’s activities, still further. Premising the evolutionary theory he draws a biological parallel between animals like frogs, newts, caterpillars on the one hand and man on the other and shows that the dissociation that is so necessary for lower animals gave way in man to an integration when he went from ground to an arboreal life and that this integration would account for the association tracts in the neopallium. In other words, the suppression of suppression by grading it so that two opposing modes of behavior become integrated. We humbly suggest that it is possible to speak of this as the instinct to suppose suppression or of an instinctive tendency to release and re-align opposing tendencies and is not this the process we call intelligence? Behold intelligence becomes instinctive!

One chapter (XI) is devoted to rescuing from common abuse the term “complex.” He takes issue with Bernard Hart whose definition of complex is any “emotionally toned system of ideas.” This is almost identical with the “sentiment” of orthodox psychologists. Rivers says “sentiments” are features of the mind which take part in the most finely graduated processes and are connected with discrimination of the most delicate description. The complex being the result of suppression always partakes in some degree of the “all-or-none” principle and in some degree is a pathological manifestation as opposed to “sentiment” which is a necessary and constant feature of normal mental life.

Chapter XII which takes up suggestion is the key to the book. Suggestion is used as “a comprehensive term for the whole process whereby one mind acts upon another unwittingly. From this point of view suggestion can be put side by side with suppression as one of the processes of instinct.” Like suppression, Rivers says, it works unwittingly. The great source of suggestion is herd life and its greatest use is in protecting the herd from danger. Its need when the “instinct for immobility” is the necessary reaction to danger is obvious when absolute uniformity is essential to the welfare of the group. It is the “instinct which is concerned with collective as opposed to individual needs” but the herd acting upon the individual for the benefit of the former unwittingly modifies the individual’s instinctive behavior. This process of modification Rivers calls suggestion. It is in fact the process by which instinctive behavior becomes modified (by inhibition?) and as such is used to explain sleep hypnotism, hysterical suppressions of sensibility, *etc.*

Instinct can act on the "all-or-none" principle only by virtue of suppression of every other pattern of behavior. Now instinct is in its turn suppressed by the herd acting through suggestion. Thus we see instinct becomes graded. The chapters on the psychoneuroses are excellent as far as they go. The biological analogies used make neuroses and psychoses more intelligible and coherent. They will stimulate further research by this method of approach.

The chapter on Sublimation is disappointing; it is barely more than two pages in length. Dr. Rivers must have seen a great deal of sublimation in his war work and I hope he will subject the data he has to a critical attitude as candid, general and searching as he has the process and end products of regression.

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Scientific Method: its Philosophy and Practice. F. W. WESTAWAY.
Second edition. London: Blackie and Son. 1919.

This text is intended apparently to aid would-be teachers in England, particularly teachers of elementary science, by giving them a grasp of the elements of logic and scientific method. Any text on logic arouses again that long deferred hope, in those who are called upon to teach the first rudiments of logic, that here at last may be a way of approach which is both worthy of the subject and inspiring to the beginning student. The book before us does not satisfy that hope, which is, alas! Utopian, but in some respects it does go half way. It is a peculiar book. Written by a pragmatist, it is scornful of deductive logic; but displays, on the other hand, a most astonishing trust in the "authorities" of inductive logic, quoting them with a scrupulous respect which some of those quoted hardly deserve. One may say indeed, that the book is an orthodox and well-referenced elementary textbook on inductive logic, plus several peculiar preludes and supplements all its own. Thus, after a couple of preliminary chapters, good but brief, there is a chapter on philosophy's task and problem, distinctly the weakest spot in the book—in spite of having been rewritten for this edition—a chapter from which the average student would doubtless draw a considerable fund of confused misinformation. Then there follows something much better, a rapid history of philosophy from the Sophists to Hume, emphasis being on the logical contributions of the philosophers, a hundred pages pretty well done. This section might make the book useful to such students as would otherwise never learn anything of Plato or Descartes. Then follows the inductive logic, which covers the usual things well, and goes far enough to mention some points not ordi-